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PATENT  
ATTY. DOCKET NO. LF/207US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant	: Staats et al.	Art Unit: 3737
Serial No.	: 09/851,462	Examiner: Eleni Mantis Mercader
Filed	: May 8, 2001	
For	REMOTELY POWERED MR INJECTOR	

Mail Stop Appeal Brief-Patents  
 Commissioner of Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

**TRANSMITTAL OF APPEAL BRIEF**

1. Transmitted herewith, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on September 26, 2007.
2. STATUS OF APPLICANT

This application is on behalf of:

Other than a Small Entity  
 Small Entity status of this application under 37 CFR 1.9 and 1.27 has been established by a verified statement previously submitted.  
 Enclosed is a verified statement to establish Small Entity status

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 CFR 1.17(f), the fee for filing the Appeal Brief is:

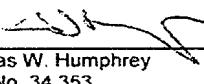
Small Entity (\$255.00)  
 Large Entity (\$510.00)  
Appeal Brief Fee Due \$510.00

4. EXTENSION OF TERM

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply. Complete (a) or (b) as applicable.

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p.3

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(a) \_\_\_\_\_ Applicant petitions for an extension of time under 37 CFR 1.136 for the total number of months checked below:

Extension <u>months</u>	Fee for other than <u>small entity</u>	Fee for <u>small entity</u>
one month	\$ 120.00	\$ 60.00
two months	\$ 450.00	\$225.00
three months	\$1020.00	\$510.00
four months	\$1590.00	\$795.00
five months	\$2160.00	\$1080.00

Extension fee due with this request \$ None.

If an additional extension of time is required, please consider this a petition therefor. (Check and complete the next item, if applicable)

An extension for \_\_\_\_\_ months has already been secured and the fee paid thereof of \$ \_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ \_\_\_\_\_.

OR

(b) \_\_\_\_\_ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

5. TOTAL FEE DUE

The total Fee due is:

Appeal Brief Fee of \$ 510.00.

Extension Fee (if any) \$ None.

**TOTAL FEE DUE \$ 510.00 and \$ \_\_\_\_\_.**

6. FEE PAYMENT AND FEE DEFICIENCY

Please charge deposit account no. 23-3000 for the amount of \$ 510.00.

If any additional fee for claims or extension of time is required, charge Account No. 23-3000.

Respectfully submitted,

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p. 4

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Ex parte Staats et al.

Appeal No. \_\_\_\_\_

Serial No.: 09/851,462  
Filed: May 8, 2001  
Group Art Unit: 3737  
Examiner: Eleni Mantis Mercader  
Applicant: Staats et al.  
Title: REMOTELY POWERED MR INJECTOR

Cincinnati, Ohio 45202

November 26, 2007

*Via Facsimile*

APPEAL BRIEF

This brief is in furtherance of Applicant's Notice of Appeal filed September 26, 2007, appealing the decision of the Examiner dated March 26, 2007 finally rejecting claims 1-17. A copy of the claims appears in the Appendix to this brief.

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p. 1

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PATENT, TRADEMARK, COPYRIGHT  
AND UNFAIR COMPETITION LAW  
AND RELATED LITIGATION

EDMUND P. WOOD 1923-1968  
TRUMAN A. HERRON 1935-1976  
EDWARD B. EVANS 1936-1971

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November 26, 2007

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Fax: 571-273-8300

From: Thomas W. Humphrey  
Re: Our File: LF-207US  
US Application Serial No. 09/851,462  
Filed May 8, 2001  
REMOTELY POWERED MR  
INJECTOR  
Staats et al.

Pages: 24 (including cover sheet)

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**Real Party In Interest**

The real party in interest in this appeal is Mallinckrodt Inc., a(n) corporation of Delaware having a place of business at 675 McDonnell Boulevard, St. Louis, MO 63134.

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p. 6

**Related Appeals and Interferences**

There are no such appeals or interferences.

**Status of Claims****Total Number of Claims in the Application**

Claims in the application are: 17

**Status of all the Claims**

1. Claims cancelled: NONE
2. Claims withdrawn from consideration but not cancelled: NONE
3. Claims objected to: 1-17
4. Claims allowed or confirmed: NONE
5. Claims rejected: 1-17

**Claims on Appeal**

The claims on appeal are Claims 1-17.

Nov 26 07 11:40p Humphrey

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P. 8

Status of Amendments

There are no amendments pending.

Summary of Claimed Subject Matter as to Independent Claim 1

Claim 1 recites a power injection system for use with an MRI system, having a power head adapted for operation within a shielded room, a power supply adapted for operation outside the shielded room, and a power connection coupling power through a penetration panel of the room from the power supply to the power head, the connection including a radio frequency filter. Embodiments of the invention recited independent Claim 1 are described in the specification on page 8, line 13 to page 10, line 13, and Fig. 2, reference numbers 64, 86 and 66 of the drawings.

Summary of Claimed Subject Matter as to Independent Claim 3

Independent Claim 3 recites a method of converting a battery-powered MRI injector system into a remotely powered system, comprising placing a power supply outside a shielded room, providing shielded cables having conductors for power transmission into the room, providing a radio frequency filter, and modifying the MRI injector to electrically couple power transmission from the cables to conductors that receive battery power. Embodiments of the invention recited independent Claim 3 are described in the specification on page 8, line 13 to page 10, line 13, and Fig. 2, reference numbers 64, 86 and 66 of the drawings.

Summary of Claimed Subject Matter as to Independent Claim 12

Independent Claim 12 recites a medical imaging suite including a shielded room, an AC outlet outside the room, and a MRI injector system with a power head located within the room, a power supply outside the room receiving power from the AC outlet, and a power connection including a radio frequency filter, and conveying electrical power from the power supply through a wall of the room to the power head. Embodiments of the invention recited independent Claim 1 are described in the specification on page 8, line 13 to page 10, line 13, and Fig. 2, reference numbers 64, 86 and 66 of the drawings.

**Grounds of Rejection - Concise Statement of Each Ground of Rejection**

Claims 10-17 are rejected under 25 U.S.C. 103(a) as being unpatentable over Critchlow et al. '555 in view of Kormos et al. '285, Ziarati '544 (US Patent No. 5,432,544), and Eichelberger et al. (US Pub. 2004/0197058).

**Argument**

Claims 1-17 are rejected under 25 U.S.C. 103(a) as being unpatentable over Critchlow et al. '555 in view of Kormos et al. '285, Ziarati '544 (US Patent No. 5,432,544), and Eichelberger et al. (US Pub. 2004/0197058). Critchlow is cited for showing a power injector for use in MR imaging, Kormos is cited for the use of a remote power supply and shielded wire, Ziarati is cited for the use of cables passing through RF filters at a penetration panel, and Eichelberger is cited for showing the bundling of cables.

Applicant respectfully submits that these references, separately or combined, fail to anticipate the claimed invention or render that invention obvious. In particular, none of the references teach or suggest the filtering a power connection leading outside of a shielded room to prevent the introduction of noise from outside the room via the power connection. The present claims are directed to an injector system or a method of installing or connecting an injector system, in which a "power connection" or "shielded cables" couple power from a "power supply outside [a] shielded room" to the inside of the shielded room, and a "radio frequency filter" is included in the power connection to "reduce radio frequency electrical energy" carried into the room by the power connection.

None of the references cited by the Examiner shows or suggests an injector system or method of retrofitting one, using a radio frequency filter on a power connection carrying power from the outside to the injector inside of a shielded room.

Critchlow is a third-generation power injector for use in MR rooms, and thus presents a refined design for such an injector. The Critchlow injector, and the two prior generation devices it references, use a battery pack (135 in Critchlow's drawings) to power the injector.

Thus, in Critchlow, a battery is used so that there is no power connection carrying electrical power into the shielded room, much less a power connection using a RF filter.

Kormos is a 2001 patent, filed in 1997, that relates to the placement of a display terminal in a shielded room of an MRI suite. Kormos retrofits of an existing LCD display for this application, which involves, among other steps, removal of the power supply, and replacement of that power supply with a shielded wire coupled to a "remote power source 32" (col. 6, lines 15-18). The power connection extends outside the room, but without any RF filter. Thus, in Kormos, power for the display is connected from outside a shielded room but there is no disclosure of the power connection having a RF filter.

Ziaratti 5,432,544 has been cited by the Examiner for its disclosure of a projector 40 inside a shielded MRI room. Fig. 1 of Ziaratti shows that signals are delivered to the projector 40 via a multi-conductor cable 44. As explained in col. 3, these signals pass through a RF filter 45. However, as is plain from Fig. 2, power is not carried through cable 44 but rather is carried through a conventional power connection cable 66. Cable 66 is not shown extending from the room in Fig. 1. Fig. 2 of Ziarati shows, on the power connection, capacitors 68B, 68C, 68F and 68G and a choke 68A, all within the shielded housing 70. However, these elements are described as having the purpose "to eliminate any electromagnetic noise from propagating from the projector into the magnet room". See col. 3, lines 63-67. Thus, Ziarati does not teach connecting to power outside of the room, nor does he suggest a need to prevent noise entering the room from outside the room via the power connection.

Eichelberger is cited only for showing the combination of conductors within a shielded cable, and so is not specifically relevant to the issues at hand.

In view of the above, Applicant would summarize as follows:

1. Critchlow teaches and suggests the use of battery power.
2. Kormos teaches and suggests the use of an unshielded power connection leading outside of the room.
3. Ziarati teaches and suggests the use of a power connection within the room, including circuitry to prevent noise from propagating out of the powered device and into the room.
4. Eichelberger teaches combining conductors within a cable.

Combining these references, Applicant submits that one would not be led to creating a power connection from the outside to the inside of a shielded room, that included a filter. Critchlow would teach away from any such connection, and since Critchlow is the only reference showing a power injector, Applicant submits that it would lead strongly away from using anything other than battery power. If one were to look to Kormos when making an injector, one would be led to using an unfiltered power connection, and again, be led away from the claimed invention. If one then looked to Ziarati for suggestions on making an injector, one would be led to connecting to a power source within the shielded room. Furthermore, one would be led to understand that the injector itself is the source of noise to be controlled – and would not be led to recognize that noise from outside the room would enter over a remote power connection such as used by Kormos. Thus, even if one chose to go against the teaching of Critchlow and make an injector using a remote power connection, the result would either be the Kormos unfiltered connection to the outside of the room, or a connection inside the room as in Ziarati.

The claims to focus these novel concepts, namely, the use of a filter on a power connection, the use of a penetration panel for the connection, and the positioning of the filter at the penetration panel. Furthermore, the claim language identifies the separate control and power connections in various claims, to identify the control and power head components in the room, and to clarify that the claims are directed to the use of remote power received via a filter, rather than the details of where that power is connected or how it is specifically used by components within the room.

In view of the clear distinctions between the claims and the cited prior art, Applicant submits that all claims are allowable over the prior art cited, and earnestly requests issuance of a Notice of Allowability.

Accordingly, Applicant submits that the Examiner's rejection is in error and a reversal of the rejection and allowance of the claims is therefore requested.

Respectfully submitted,  
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### Claim Appendix

1. (Previously presented) A power injector system for use with a magnetic resonance imaging system installed at least in part within an electromagnetic interference shielded room electrically accessible via a penetration panel, the power injector system comprising:
  - a power head and power control unit adapted for operation within the shielded room to controllably inject a compound into a patient;
  - a power supply for operation outside the shielded room to receive utility electrical power; and
  - a power connection configured to couple electrical power through the penetration panel between the power supply outside of the shielded room and the power control, the power connection comprising a radio frequency filter reducing radio frequency electrical energy carried through said power connection.
  
2. (Previously presented) The power injector system of claim 1, further comprising
  - a control panel for generating data signals to control said power head adapted for operation outside the shielded room;
  - a power head control for actuating the powerhead; and
  - a data connection coupling said data signals from said control panel to said power head control for actuating said power head.

3. (Previously presented) A method of connecting a battery-powered magnetic resonance (MR) injector system in a shielded magnet room to a remote power supply, the method comprising:

placing a power supply outside of the shielded magnet room, the power supply coupled to an AC outlet for electrical power;

providing shielded cables having conductors adapted for electrical power transmission, wherein one cable positioned outside the magnet room couples the power supply to a penetration panel and the other cable positioned inside the magnet room couples the power from the power supply from the penetration panel the MR injector system,

providing a radio frequency filter at the penetration panel reducing radio frequency electrical energy carried through at least one conductor of at least one of said shielded cables; and

connecting a power control of the MR injector system in said shielded magnet room to conductors of the shielded cables so that power from said power supply is provided to components of said injector system that previously received only battery power.

4. (Previously Presented) The method of claim 3, further comprising:

in the power supply, relaying data signals from a console in the control room to the shielded cable.

5. (Original) The method of claim 3, further comprising:

in the power supply, coupling AC electrical power from an AC outlet to an AC outlet externally mounted on the power supply for powering the console.

6. (Original) The power injector system of claim 1, wherein said radio frequency filter is incorporated within said penetration panel.

7. (Previously presented) The method of claim 3, wherein said radio frequency filter is incorporated within said penetration panel.

8. (Previously presented) The power injector system of claim 1, wherein the power head comprises an electro-mechanical device, and the power connection is configured to actuate the electro-mechanical device.

9. (Previously presented) The power injector system of claim 8, wherein the power head comprises an ultrasonic motor, and the power connection is configured to actuate the ultrasonic motor.

10. (Previously presented) The power injector system of claim 1, wherein said radio frequency filter grounds conductive shields included within said power connection.

11. (Previously presented) The power injector system of claim 1, wherein said radio frequency filter attenuates RF noise within a rejection frequency band

selected to correspond to the RF frequencies used by said magnetic resonance imaging system.

12. (Previously presented) A medical imaging suite comprising:

a shielded room having walls that include electromagnetic shielding;  
an AC power outlet located outside the room;  
a magnetic resonance imaging system comprising a magnet that is located inside the room; and  
a power injector system comprising:  
a power head and power control located inside the room;  
a power supply located outside the room, the power supply accessing and receiving power from the AC power outlet; and  
a power connection configured to convey electrical power from the power supply, through a wall of the room, and to the power control, wherein the power connection comprises a radio frequency filter.

13. (Previously presented) The imaging suite of claim 12, wherein the power head comprises an electro-mechanical device, and the power connection is configured to provide power to the electro-mechanical device.

14. (Previously presented) The imaging suite of claim 12, wherein the power head comprises an ultrasonic motor, and the power connection is configured to provide power to the ultrasonic motor.

15. (Previously presented) The imaging suite of claim 12, further comprising a control panel located outside the room for generating data signals to control said power head;

said power connection further configured to convey data signals from said control panel to said power head for controlling said power head.

16. (Previously presented) The imaging suite of claim 12, wherein said radio frequency filter grounds conductive shields included within said power connection.

17. (Previously presented) The imaging suite of claim 12, wherein said radio frequency filter attenuates RF noise within a rejection frequency band selected to correspond to the RF frequencies used by said magnetic resonance imaging system.

Nov 26 07 11:43p

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p.22

**Evidence Appendix**

None.

-19-

Nov 26 07 11:44p

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p. 23

**Related Proceedings Appendix**

None.

-20-

**TABLE OF CONTENTS**

Real Party In Interest .....	-2-
Related Appeals and Interferences .....	-3-
Status of Claims .....	-4-
Total Number of Claims in the Application .....	-4-
Status of all the Claims .....	-4-
Claims on Appeal .....	-4-
Status of Amendments .....	-5-
Summary of Claimed Subject Matter as to Independent Claim 1 .....	-6-
Summary of Claimed Subject Matter as to Independent Claim 3 .....	-7-
Summary of Claimed Subject Matter as to Independent Claim 12 .....	-8-
Grounds of Rejection - Concise Statement of Each Ground of Rejection .....	-9-
Argument .....	-10-
Claim Appendix .....	-14-
Evidence Appendix .....	-19-
Related Proceedings Appendix .....	-20-